REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
	Technical Papers	

4. TITLE AND SUBTITLE

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

5d. PROJECT NUMBER
2302

5e. TASK NUMBER
M1G2

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Research Laboratory (AFMC)
AFRL/PRS
5 Pollux Drive
Edwards AFB CA 93524-7048

8. PERFORMING ORGANIZATION REPORT

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Research Laboratory (AFMC)
AFRL/PRS
5 Pollux Drive
Edwards AFB CA 93524-7048

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Leilani Richardson
Unclassified	Unclassified	Unclassified	A		19b. TELEPHONE NUMBER *(include area code)* (661) 275-5015

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. 239.18

3k separate files are enclosed

11/5/26

r DTS

JON 2303M1G2

MEMORANDUM FOR PRS (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO) 24 August 1999

SUBJECT: Authorization for Release of Technical Information, Control Number: AFRL-PR-ED-TP-FY99-0171
C.T. Liu, "Application of Real-Time X-Ray Technique to Monitor Damage Process in a Particulate Filled Composite"

Presentation at International Conference **(Statement A)**

Distribution

Application of Real-Time X-Ray Technique to Monitor Damage Process in a Particulate Filled Elastomer

C.T. Liu

Air Force Research Laboratory

Edwards AFB, CA 93524-7680

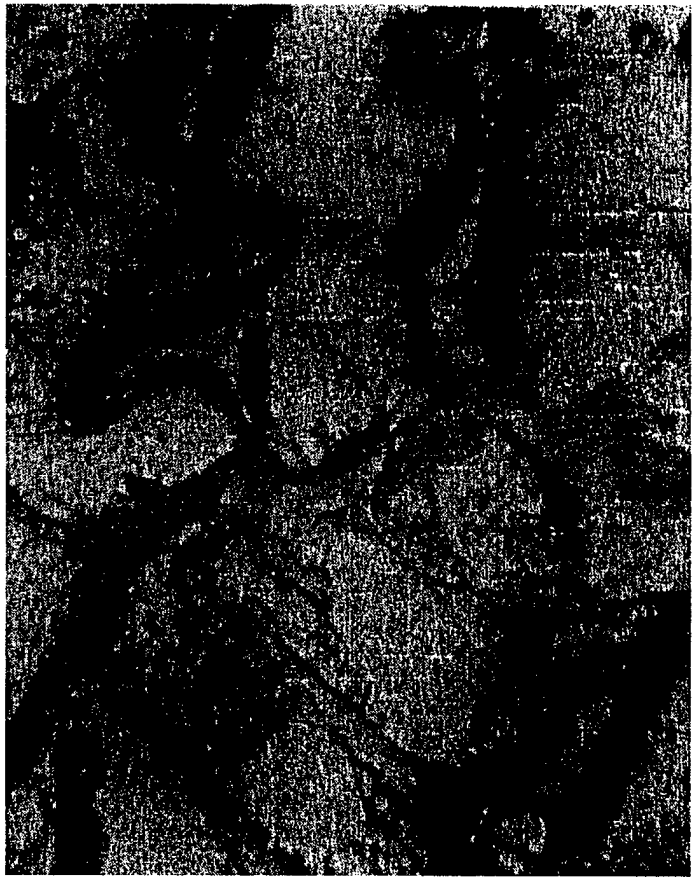
Objectives

- Investigate Damage Initiation and Evolution Processes Using Real-Time X-Ray Techniques.
- Investigate the Effect of Damage on Crack Growth Behavior.

Local Dewetting About Filler Particles in Propellant

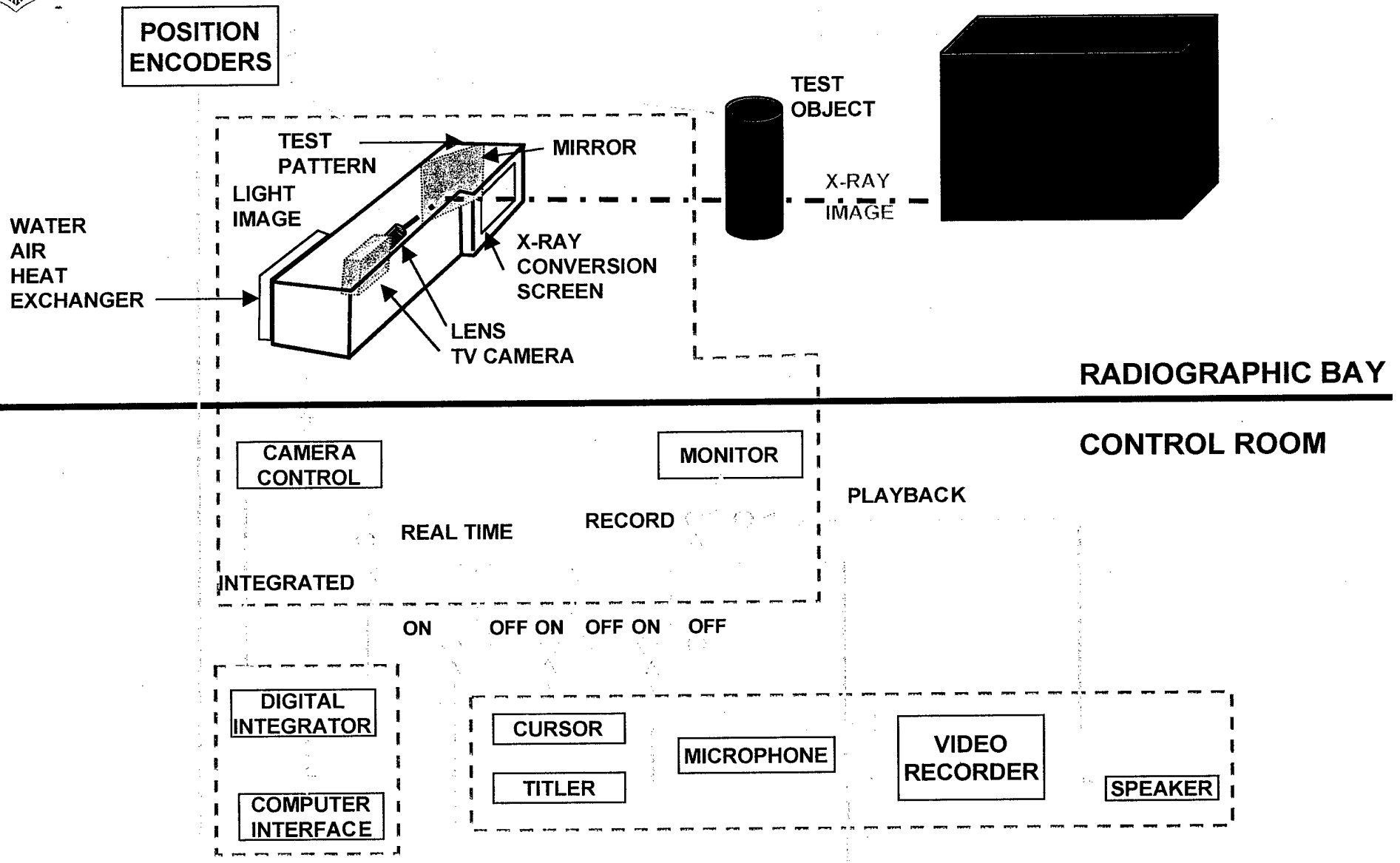
Direction of Strain

Unstrained

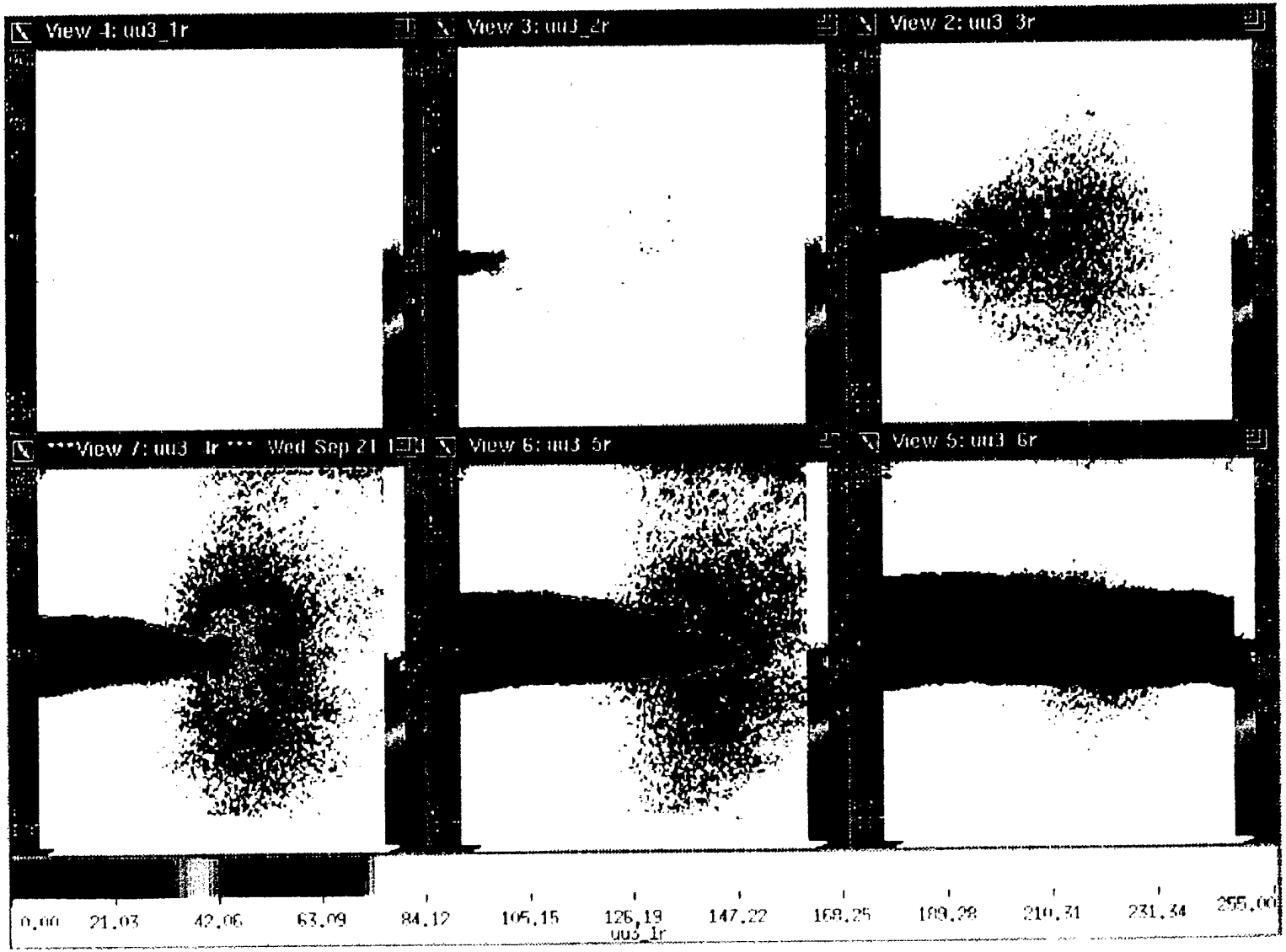


30% Strain

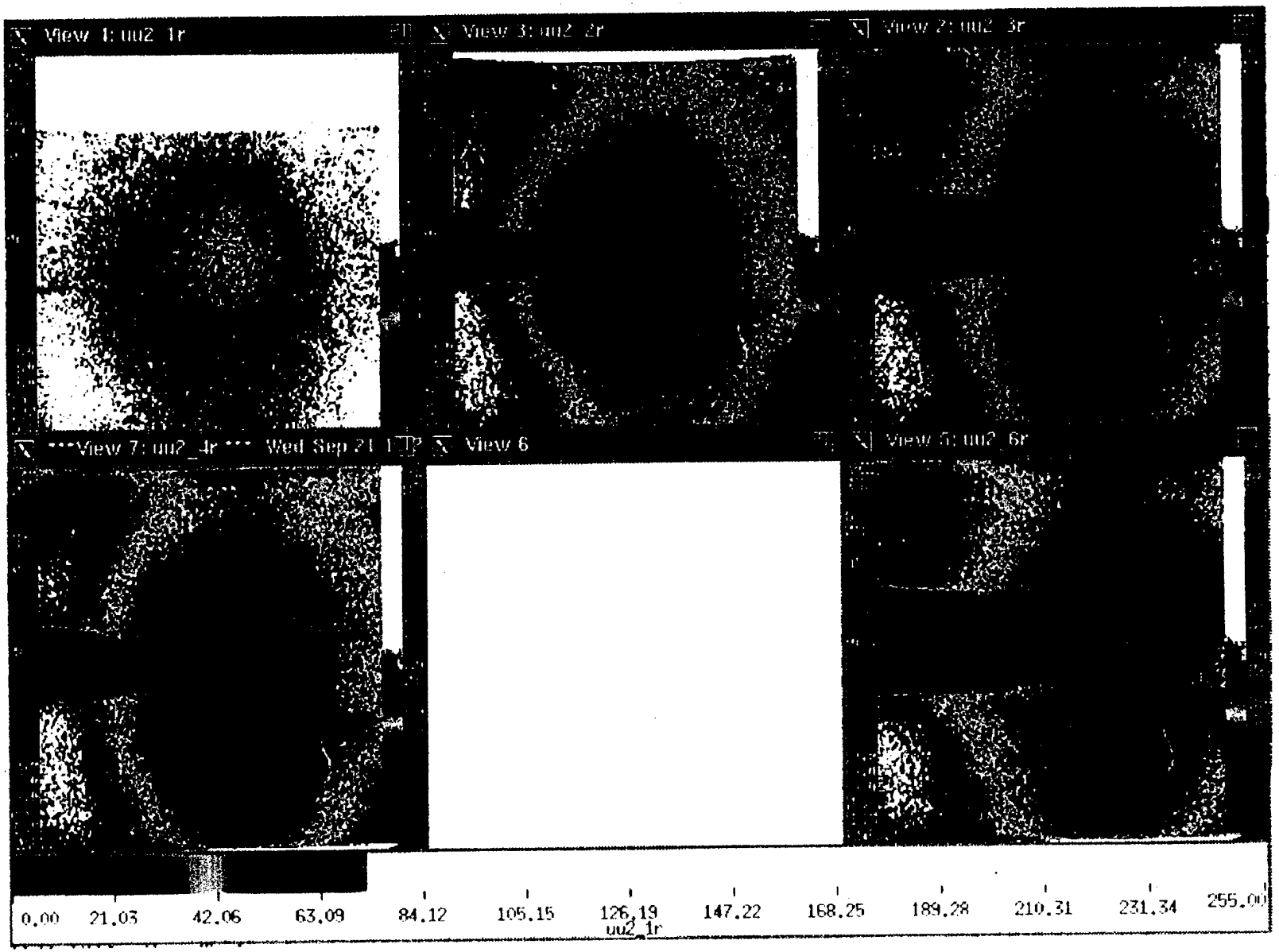
Block Diagram of a Real-Time Radiographic System



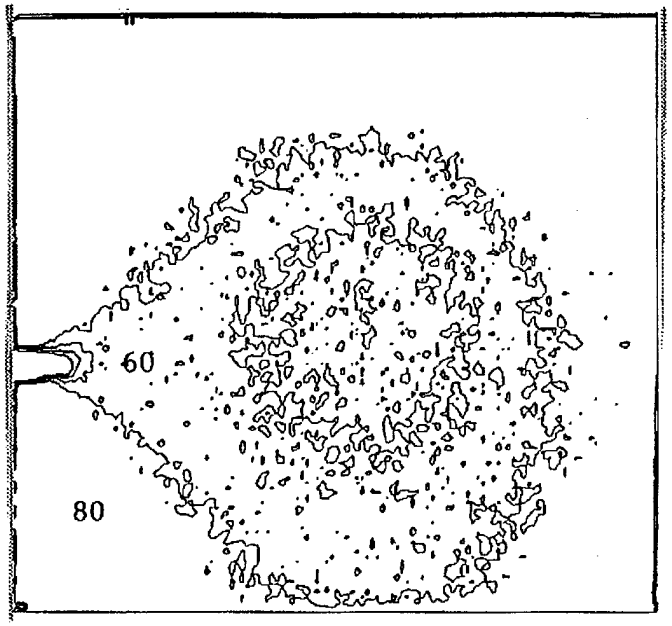
Specimen 7

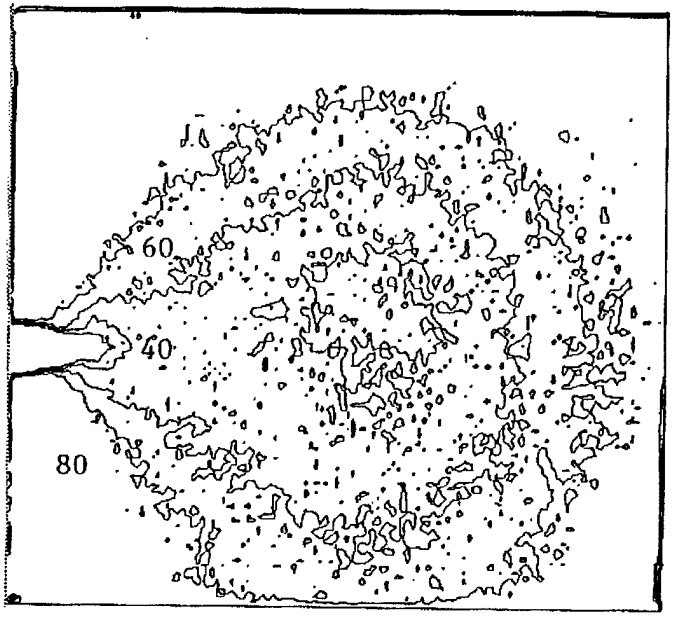

View 4: uu3_1r
View 3: uu3_2r
View 2: uu3_3r
***View 7: uu3_1r *** Wed Sep 21
View 6: uu3_5r
View 5: uu3_6r
0.00
21.03
42.06
63.09
84.12
105.15
126.19
147.22
168.25
189.28
210.31
231.34
255.00
uu3_1r

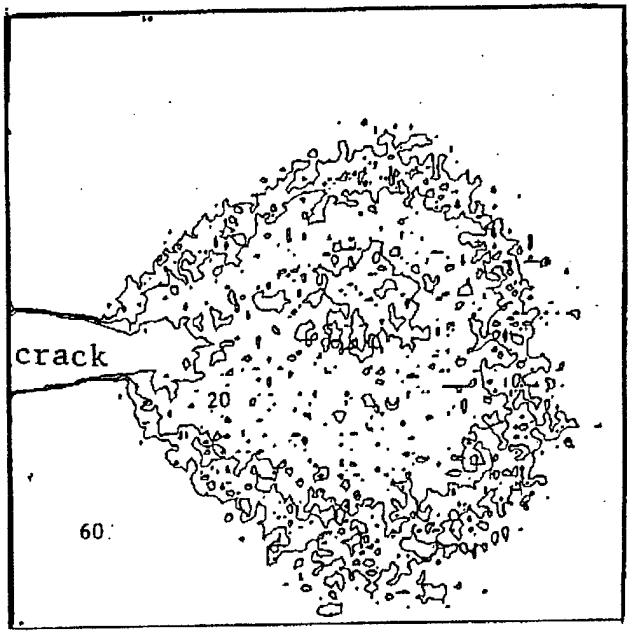
Specimen 6

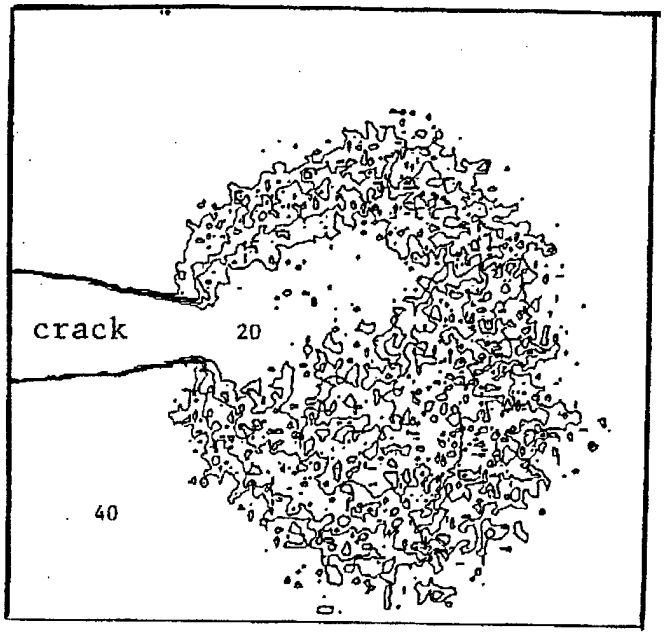

View 1: uu2_1r
View 3: uu2_2r
View 2: uu2_3r
***View 7: uu2_4r *** Wed Sep 21 1
View 6
View 5: uu2_6r
0.00
21.03
42.06
63.09
84.12
105.15
126.19
147.22
168.25
189.28
210.31
231.34
255.00
uu2_1r

Iso-Intensity Contour Plots of I_t Near Crack Tip

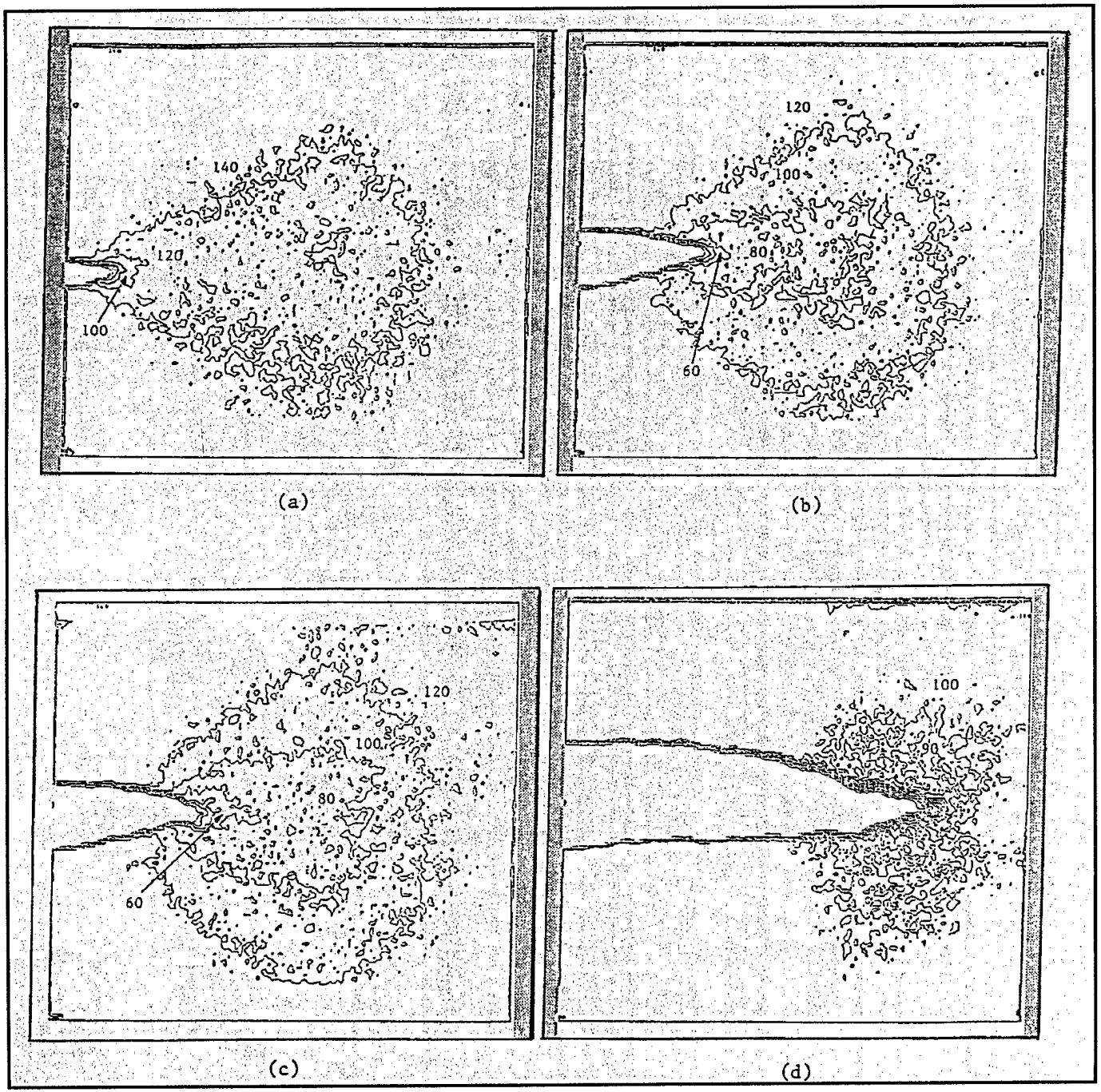




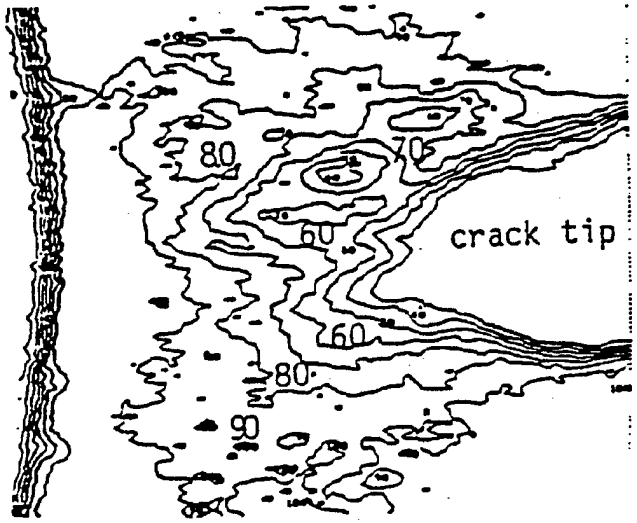




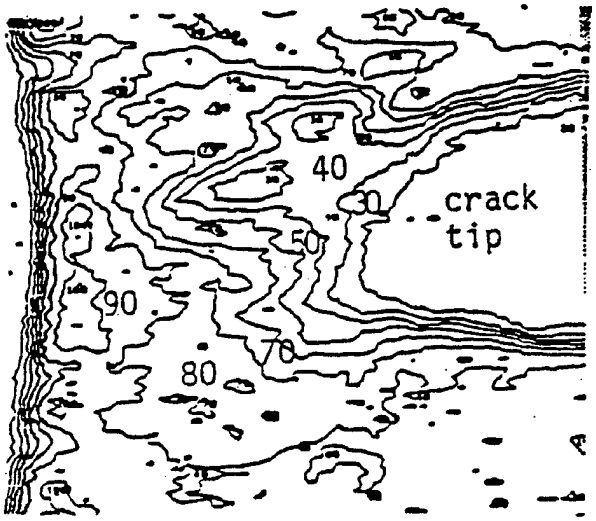
Iso-Intensity Contour Plots of I_t Near Crack Tip



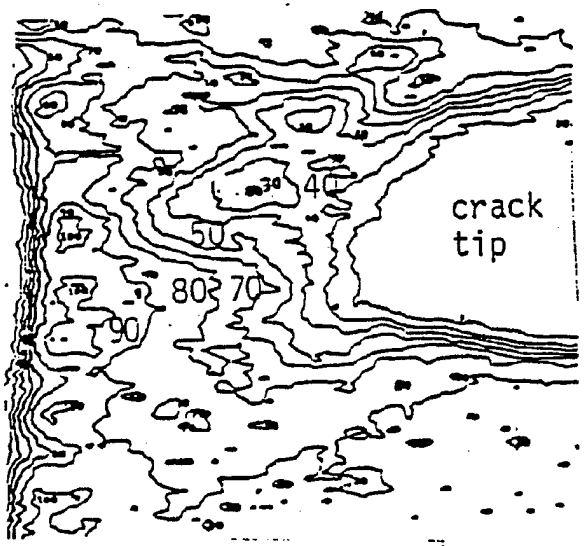
Iso-Intensity Contour Plots of I_t Near Crack Tip



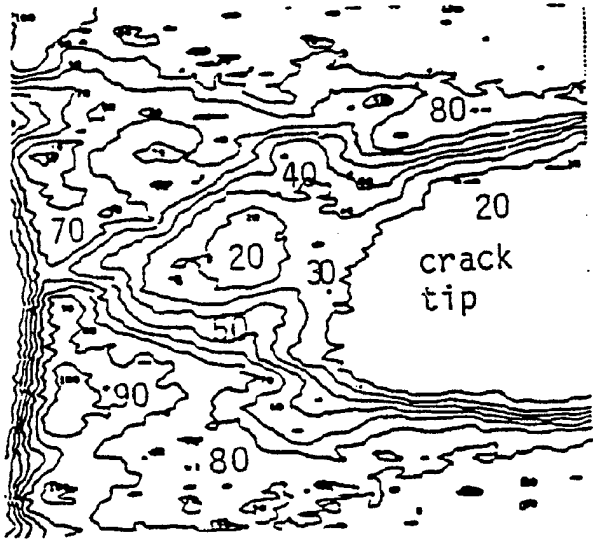
(e) ϵ = 13.5%



(f) ϵ = 13.5%

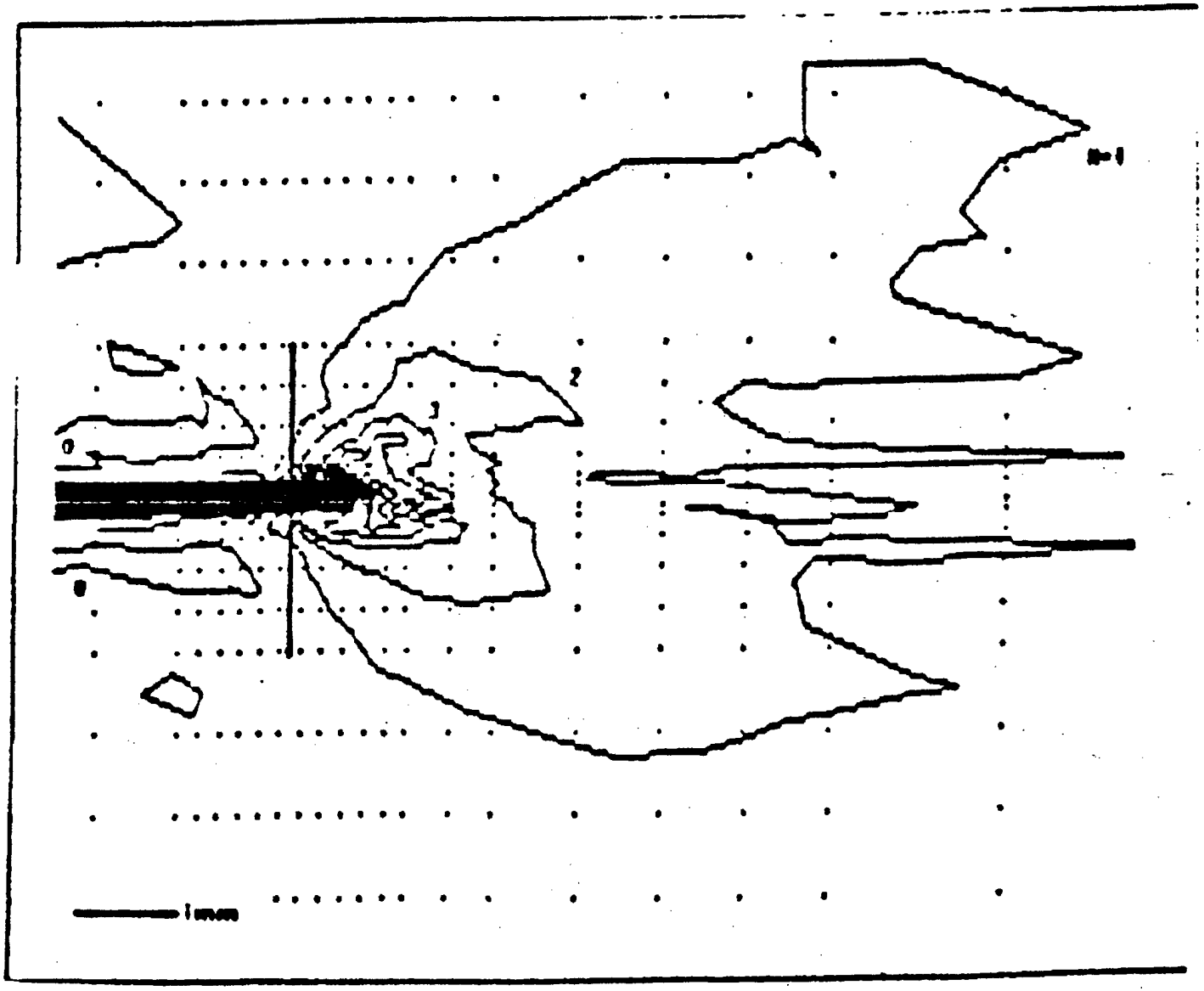


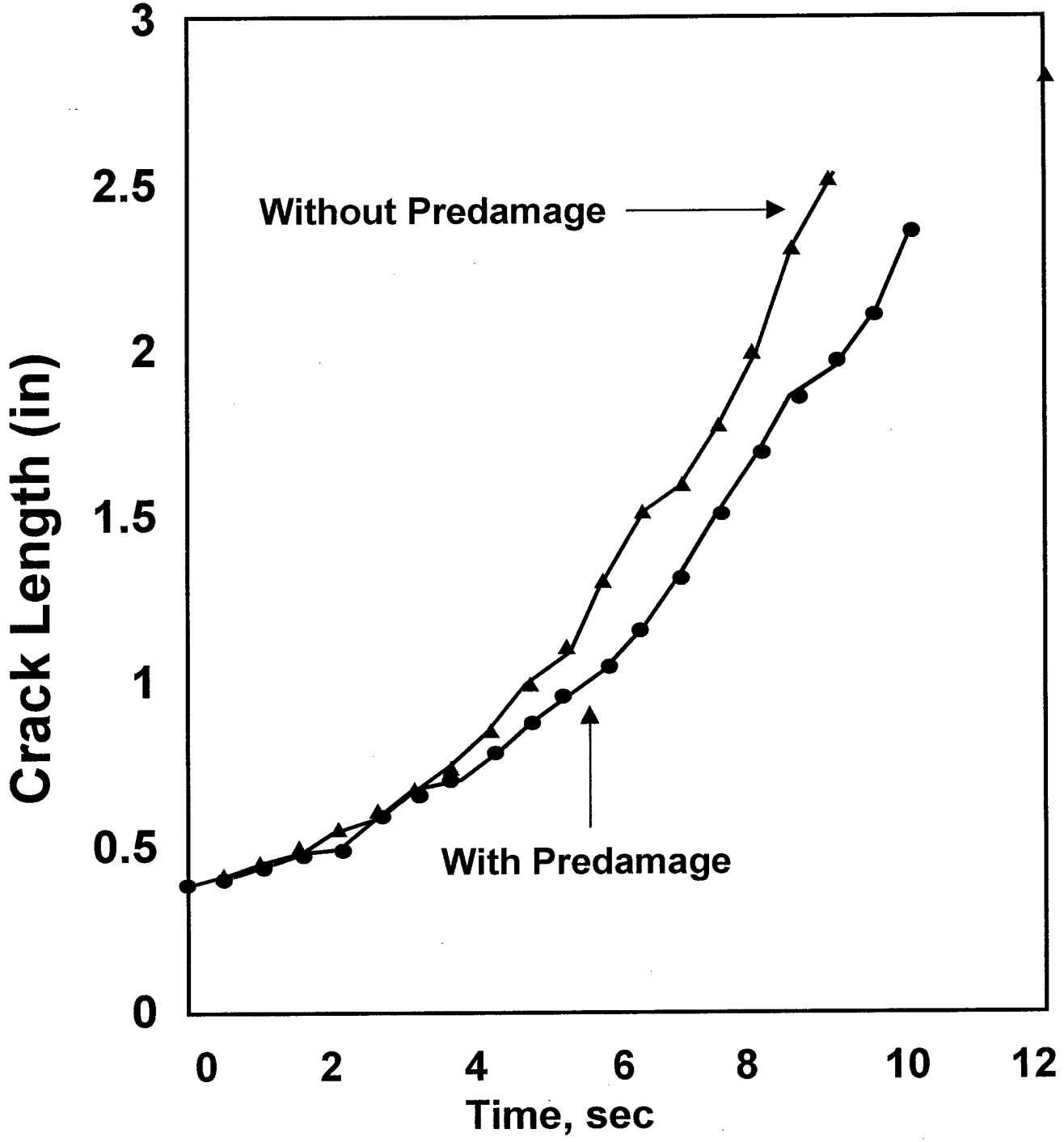
(g) ϵ = 13.5%

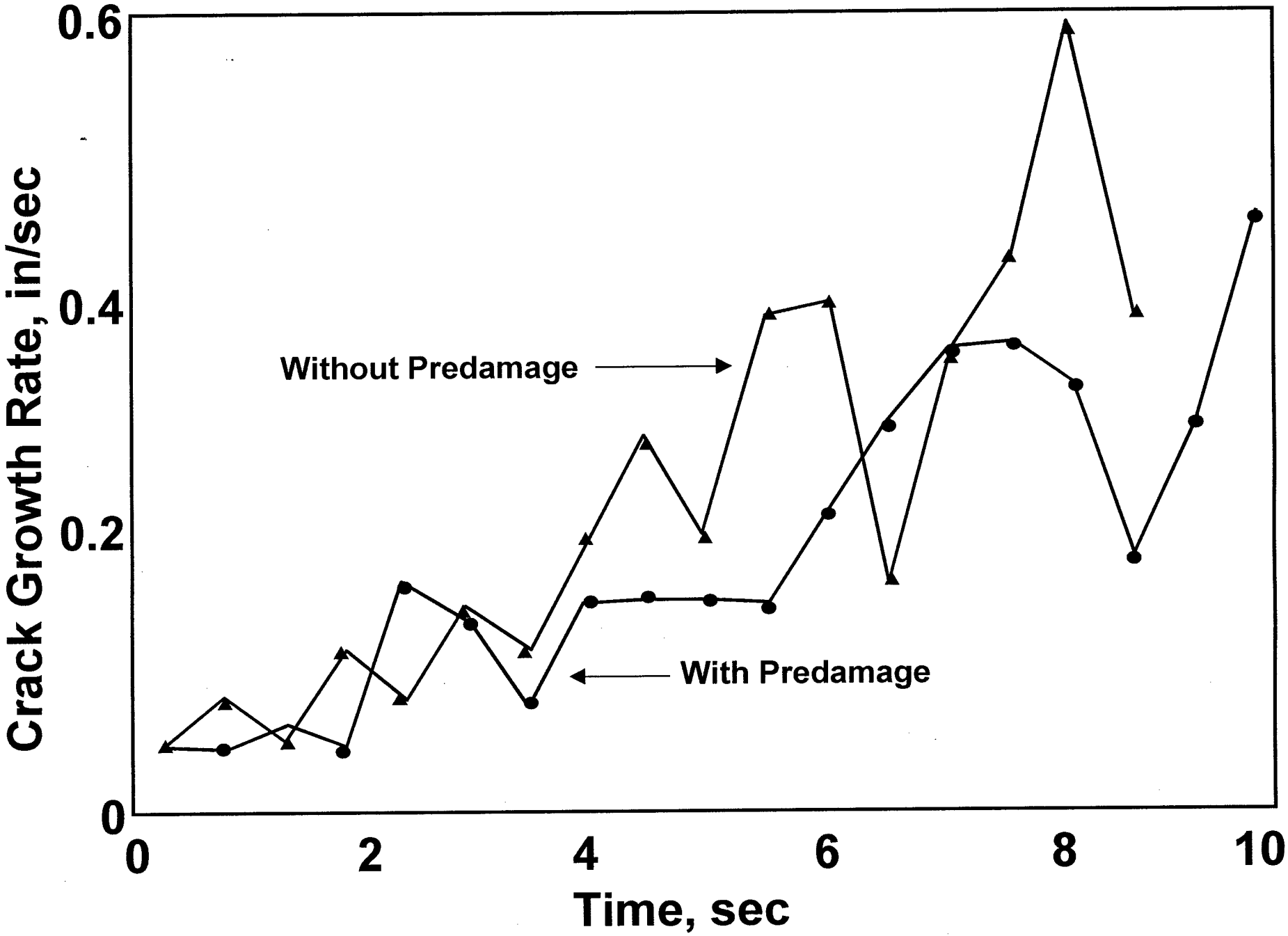


(h) ϵ =13.5%

Normal Strain (Experimental Result)




Crack Length (in)
3
2.5
2
1.5
1
0.5
0
Without Predamage
With Predamage
0
2
4
6
8
10
12
Time, sec


0.6
0.4
0.2
0
Crack Growth Rate, in/sec
Without Predamage
With Predamage
0
2
4
6
8
10
Time, sec

Conclusions

- Under a Constant Strain Rate Loading Condition, Damage Zone Size and Intensity of Damage Increase with Increasing Time.
- Pre-Damage does Affect the Crack Growth Behavior.
- The Damage Distribution is Roughly Commensurate with the Strain Distribution in the Specimen.
- The Real-Time X-Ray Technique is a Promising Technique to Monitor Damage Initiation and Evolution Processes in the Material.